

REMARKS

The claims were objected to under section 112 on the basis that the newly added limitation of “B-staged” wasn’t clear as to whether it was as required element. The fact that the adhesive is in a B-staged state was certainly intended to be a positive limitation of the claim. Although it is believed that the previously presented language was clear, the relevant language has been reworded in an effort to avoid any doubt that the B-staged state of the adhesive is a positive limitation of the claims.

The claims all stand rejected on the basis of both (a) the Chung reference; and (b) the Capote reference.

The Chung Reference

It is believed that the Chung reference is more relevant to the previously presented claims because it describes a B-staged underfill preform. The amendments to independent claims 1 and 35 set forth above are intended to better distinguish the Chung reference. More specifically, the underfill layer described by Chung is applied as a preform. That is, it is formed as a rigid unit before it is adhered to the wafer. In contrast, in the present invention as now claimed, the underfill is applied as a flowable material that surrounds solid solder bumps. (It is noted that claims 19 and 35 have been amended to exclude the solder paste embodiments). As such, the adhesive conformally surrounds the solid (non-paste) solder bumps. Claims 19 and 35 have been amended to affirmatively require that the adhesive conformally surround the solder bumps. In contrast, a preform will not conformally surround a solid solder bumps. It is respectfully submitted that applying the underfill as a flowable material is a simpler and more efficient approach than attaching a preform to the front of a wafer. In view of the foregoing, it is respectfully submitted that amended independent claims 19 and 35 are neither disclosed nor reasonably suggested by the Chung reference.

The Dam Feature- Claim 43

Claim 43 has been rewritten in independent form. As previously presented, claim 43 required “a dam around the periphery of the wafer to prevent the underfill material deposited onto the active surface of the wafer from flowing off the wafer before the partial curing of the adhesive layer.”

The outstanding rejection indicates that claim 43 is obvious in view of Chung – but does not articulate a reason why. Since Chung contemplates the use of a preform, there would presumably be no reason to utilize a dam and accordingly it is respectfully submitted that the structure recited in claim 43 would not be reasonably suggested by Chung. It is noted that dependent claim 32 (which depends from claim 19) also requires the dam feature and it is respectfully submitted that this claim is patentable over the Chung reference for this reason as well.

The Capote Reference

The outstanding office action repeats the rejection of all of the pending claims based on the Capote reference. The rejection acknowledges that Capote fails to disclose the use of a B-staged adhesive, but asserts that such a modification would have been obvious to those of ordinary skill in the art. The office action takes the position that since B-stageable adhesives were known, it would have been obvious to those of ordinary skill in the art to substitute a B-stageable adhesive for the adhesive materials described by Capote. The position is respectfully traversed for the reasons set forth in our previous response. Further, amended claims 19 and 35 now specifically require that the B-staged adhesive conformally surround solid solder bumps. Although Capote appears to contemplate applying certain adhesives to a bumped wafer in a liquid form (see, e.g., paragraph 0037) – which would result the encapsulant conformally surrounding the solder bumps - nothing suggest that such an adhesive is B-staged as required by all of the pending claims.

Additionally, nothing in the Capote reference suggests the dam feature recited in claims 32 and 43.

In view of the foregoing, it is respectfully submitted that all of the pending claims are patentably distinct from the cited art of record for at least this reasons.

If any fees are required in connection with the filing of this response, including any fees required for any required extension of time, such fees may be charged to Deposit Account No. 500388 (Order No. NSC1P131X1). Should the Examiner believe that a telephone conference

would expedite the prosecution of this application, the undersigned can be reached at the telephone number set out below.

Respectfully submitted,
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